

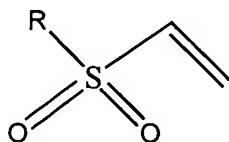
In the Claims:

Please cancel claims 1-17 and add new claims 18-34 listed below.

Listing of claims:

1-17. (Canceled)

18. (New) A non-aqueous electrolyte comprising (i) a non-aqueous solvent comprising 5 – 50% by volume of a cyclic carbonate, 5 – 75% by volume of a cyclic ester and 0 – 70% by volume of a linear carbonate and (ii) an electrolyte salt dissolved therein and (iii) 0.01 to 20% by weight, based upon a total weight of the electrolyte, of a vinyl sulfone derivative having the formula (I):



(I)

wherein R is selected from the group consisting of a C₁ to C₁₂ alkyl group, a C₂ to C₁₂ alkenyl group, and a C₃ to C₆ cycloalkyl group, wherein said non-aqueous electrolyte is in the state of a liquid.

19. (New) The non-aqueous electrolyte as claimed in claim 18, wherein said vinyl sulfone derivative (I) comprises divinyl sulfone.

20. (New) The non-aqueous electrolyte as claimed in claim 18, wherein the electrolyte salt comprises at least one compound selected from the group consisting of LiPF₆, LiBF₄, LiClO₄, LiN(SO₂CF₃)₂, LiN(SO₂C₂F₅)₂, LiC(SO₂CF₃)₃, LiPF₃(CF₃)₃, LiPF₃(C₂F₅)₃, LiPF₄(C₂F₅)₂, LiPF₅(iso-C₃F₇), and LiPF₄(iso-C₃F₇)₂.

21. (New) The non-aqueous electrolyte as claimed in claim 20, wherein the electrolyte salt comprises LiBF₄.

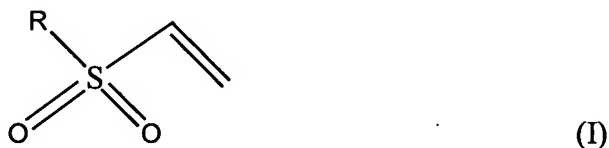
22. (New) The non-aqueous electrolyte as claimed in claim 18, wherein the content of the vinyl sulfone derivative (I) is 0.1 to 10% by weight, based upon a total weight of the electrolyte.

23. (New) The non-aqueous electrolyte as claimed in claim 18, wherein the cyclic carbonate comprises at least one member selected from the group consisting of ethylene carbonate (EC), propylene carbonate (PC) and butylene carbonate (BC).

24. (New) The non-aqueous electrolyte as claimed in claim 18, wherein the cyclic ester comprises at least one member selected from the group consisting of γ -butyrolactone and γ -valerolactone.

25. (New) The non-aqueous electrolyte as claimed in claim 18, wherein the linear carbonate comprises at least one member selected from the group consisting of dimethyl carbonate (DMC), methylethyl carbonate (MEC), diethyl carbonate (DEC), methyipropyl carbonate (MPC), butylmethyl carbonate (BMC), methylisopropyl carbonate (MIPC), isobutylmethyl carbonate (IBMC), sec-butylmethyl carbonate (SBMC) and tert-butylmethyl carbonate (TBMC).

26. (New) A lithium secondary battery comprising (a) a cathode, (b) an anode and (c) a non-aqueous electrolyte comprising (i) a non-aqueous solvent comprising 5 – 50% by volume of a cyclic carbonate, 5 – 75% by weight of a cyclic ester and 0 – 70% by volume of a linear carbonate and (ii) an electrolyte salt dissolved therein, and (iii) 0.01 to 20% by weight, based upon a total weight of the electrolyte, of a vinyl sulfone derivative having the formula (I):



wherein R is selected from the group consisting of a C₁ to C₁₂ alkyl group, C₂ to C₁₂ alkenyl group, and C₃ to C₆ cycloalkyl group, wherein said non-aqueous electrolyte is in the state of a liquid.

27. (New) The lithium secondary battery as claimed in claim 26, wherein said vinyl sulfone derivative (I) is divinyl sulfone.

28. (New) The lithium secondary battery as claimed in claim 26, wherein the

electrolyte salt comprises at least one compound selected from the group consisting of LiPF_6 , LiBF_4 , LiClO_4 , $\text{LiN}(\text{SO}_2\text{CF}_3)_2$, $\text{LiN}(\text{SO}_2\text{C}_2\text{F}_5)_2$, $\text{LiC}(\text{SO}_2\text{CF}_3)_3$, $\text{LiPF}_3(\text{CF}_3)_3$, $\text{LiPF}_3(\text{C}_2\text{CF}_5)_3$, $\text{LiPF}_4(\text{C}_2\text{F}_5)_2$, $\text{LiPF}_5(\text{iso-C}_3\text{F}_7)$, and $\text{LiPF}_4(\text{iso-C}_3\text{F}_7)_2$.

29. (New) The lithium secondary battery as claimed in claim 28, wherein the electrolyte salt comprises LiBF_4 .

30. (New) The lithium secondary battery as claimed in claim 26, wherein the content of the vinyl sulfone derivative (I) is 0.1 to 10% by weight, based upon the total weight of the electrolyte.

31. (New) The lithium secondary battery as claimed in claim 26, wherein the cyclic carbonate comprises at least one member selected from the group consisting of ethylene carbonate (EC), propylene carbonate (PC) and butylene carbonate (BC).

32. (New) The lithium secondary battery as claimed in claim 26, wherein the cyclic ester comprises at least one member selected from the group consisting of γ -butyrolactone and γ -valerolactone.

33. (New) The lithium secondary battery as claimed in claim 26, wherein the linear carbonate comprises at least one member selected from the group consisting of dimethyl carbonate (DMC), methylethyl carbonate (MEC), diethyl carbonate (DEC), methylpropyl carbonate (MPC), butylmethyl carbonate (BMC), methylisopropyl carbonate (MIPC), isobutylmethyl carbonate (IBMC), sec-butylmethyl carbonate (SBMC) and tert-butylmethyl carbonate (TBMC).

34. (New) The lithium secondary battery as claimed in claim 26, wherein said anode comprises a carbonaceous material having a graphite-type crystal structure having a lattice spacing (d_{002}) of the lattice face (002) of about 0.335 to 0.340 nanometers.